Space Weather Forecast

Issued on Monday, 21 February 2022 at 13:18 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Slight chance of Minor Geomagnetic Storms day 1 into day 2 (21st/22nd). Slight chance throughout of Moderate flares.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Very Low over the past 24 hours, with only minor flares recorded. The existing sunspot regions on the visible disc have remained small and simple, and have exhibited some signs of decay. During the past 24 hours 2 new regions have rotated round the east horizon. The first of these appears to be a mature but stable region. The region following behind is still yet to come fully into view, and will require further analysis as it does, as it is thought to be the source of a notable far-sided flare and Coronal Mass Ejection (CME) on the 15th.
No Earth-directed CMEs were observed in the available imagery during the past 24 hours.

Solar Wind / Geomagnetic Activity: The solar wind has indicated that Earth has been experiencing the fast winds from a positive coronal hole. The wind speed has been slightly elevated or elevated, ranging between 480 and 560 km/s. The total magnetic field strength, has been weak (<8 nT), with no significant deflections in its north-south component. Resultant geomagnetic activity was Quiet to Unsettled (Kp 1-3).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) has remained very slightly above background levels, but is gradually declining and is well below the threshold for solar radiation storms. This was due to the large far sided flare and CME on the 15th.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is likely to be Very Low or Low, but there is a slight chance of rising to Moderate levels through the 4 days due to the potential for flaring from the new regions emerging from the northeast limb. The other sunspot regions on the Earth-facing disc are currently unlikely to produce significant flares.

Solar Wind / Geomagnetic Activity: There are no Earth-directed CMEs in the forecast. Earth is experiencing the fast winds from a coronal hole, with this expected to persist during day 1 (21 Feb) and into day 2 (22 Feb), before gradually easing. Geomagnetic activity is expected to start Quiet to Unsettled, with a chance of Active intervals and slight chance of a Minor Storm. However, this risk will reduce through the forecast period and activity is expected to become predominantly Quiet for days 3 and 4 (23rd and 24th).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to soon fall to background, with no solar radiation storms expected through the period.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	15	10	5	2
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	10	15	20	20
Very Active	R3 to R5 X	No	2	2	2	2

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	1	1	1	1
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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